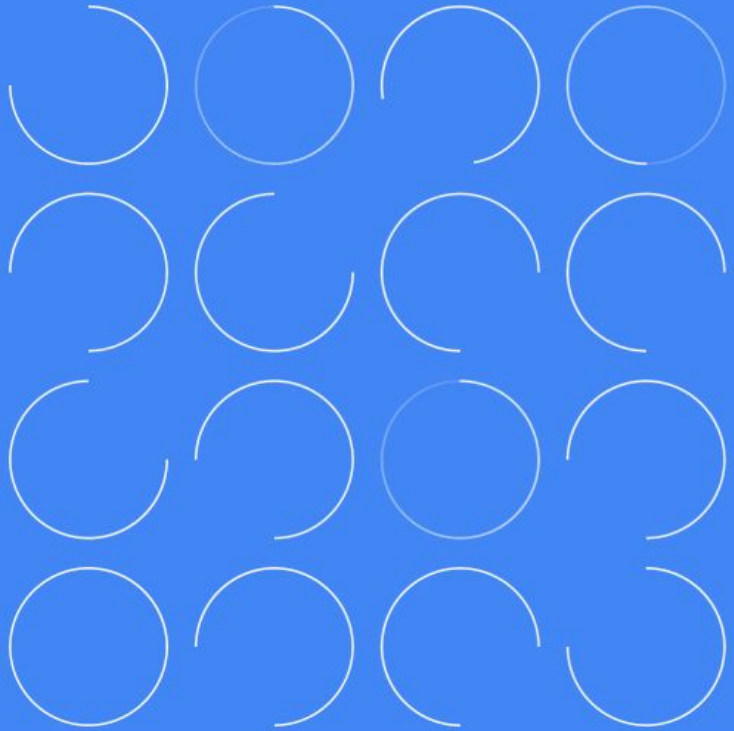
We'll be starting at 18:40

今天簡報 → linktr.ee/youjun_talk

提問可以透過 Google Meet 右下角的聊天區 💬 做發問



Google Developer Student Clubs

Introduction to AI/ML/DL & Google Cloud AutoML

GDSC 2022 Tamsui Campus Plan
Event Date: 2022/04/17 evening
Speaker: Youjun(余佑駿)

Google Developer Student Clubs

余佑駿 Youjun
Cloud Architect

littlefish0331
you-jun-yu
littlefish0331
littlefish0331@gmail.com

經歷】

2021 宏庭股份有限公司 Microfusion Technology
GCP解決方案部 雲端架構師

2019 國家高速網路與計算中心 資料科學家

2017 國立政治大學 統計所

2012 國立清華大學 數學系輔修教育學程

競賽/Side-Project/演講】

2022 (GDSC-TKU)
Introduction to Data Visualization & Data Studio

2021 (GDG)
How to Migrate Your Google Drive to Cloud Storage

2021 (Tbrain) Tomofun 狗音辨識: 4th + 評審獎

2019 (Kaggle) LANL Earthquake Prediction: top 23%

塵世中一個迷途小書僮，從資料科學走向雲端科技。

平時喜歡數據分析、機器學習、參與社群活動。

希望用科技創造更美好的世界。

Linktree linktr.ee/youjun

履歷、專案
社群分享

可以交流
考證照經驗

Google Cloud Certified
CLOUD ARCHITECT

aws certified
Solutions Architect
Associate

Microsoft CERTIFIED
AZURE FUNDAMENTALS
DATA FUNDAMENTALS

AI / ML / DL

Agenda

Google Cloud AutoML

Time	Topic
18:35 - 18:55	Module 1 : 資料科學承先啟後 • Definition • 歷史發展 • What will happen in future?
18:55 - 19:25	Module 2 : Google Cloud AutoML • Overview • Compare to ML API • Use Case, Scenario and demo
19:25 - 19:35	QA & Take a Break

Google Cloud

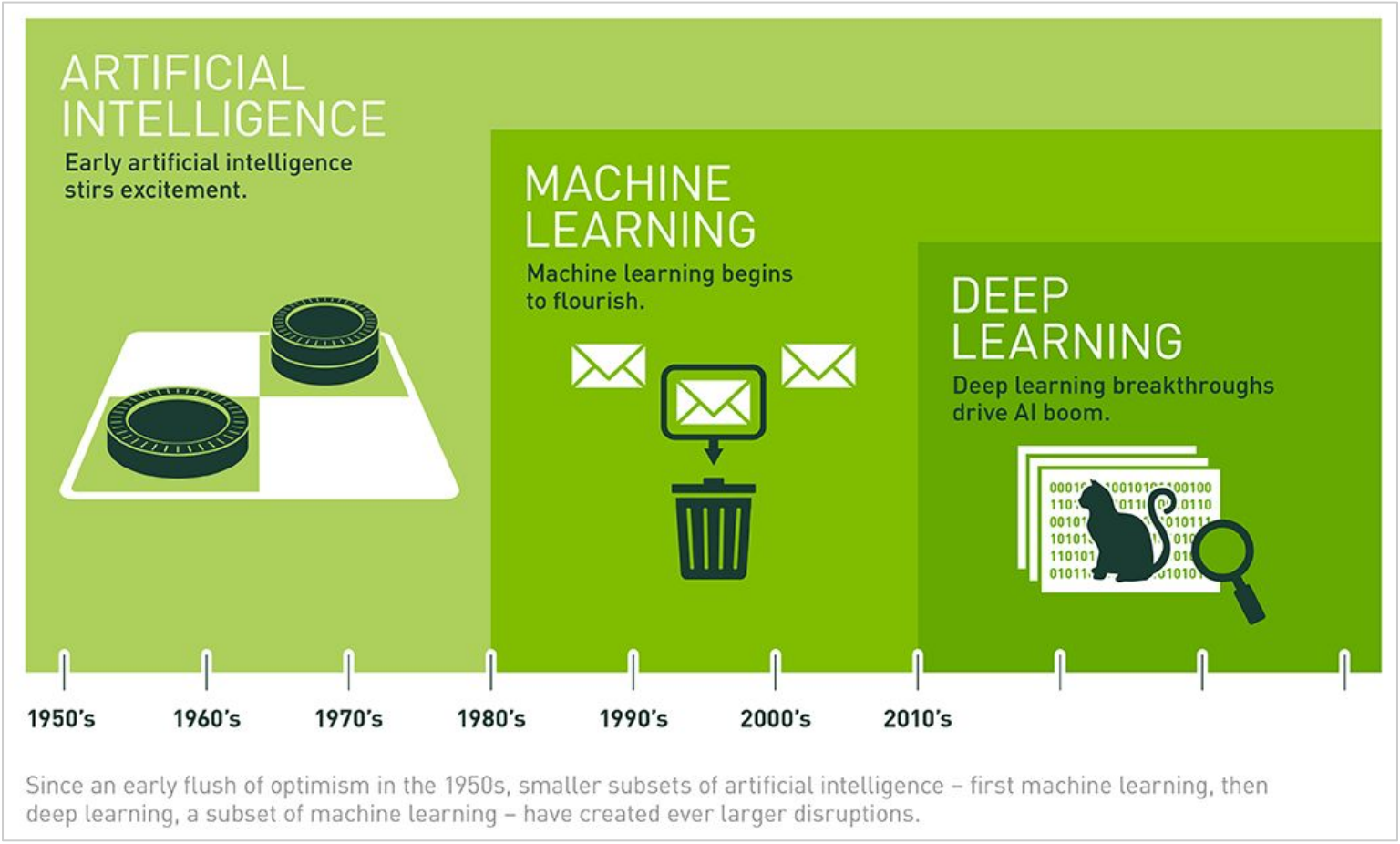
資料科學承先啟後

- AI/ML/DL Overview
- Challenge
- What will happen in future?

01

Google Cloud

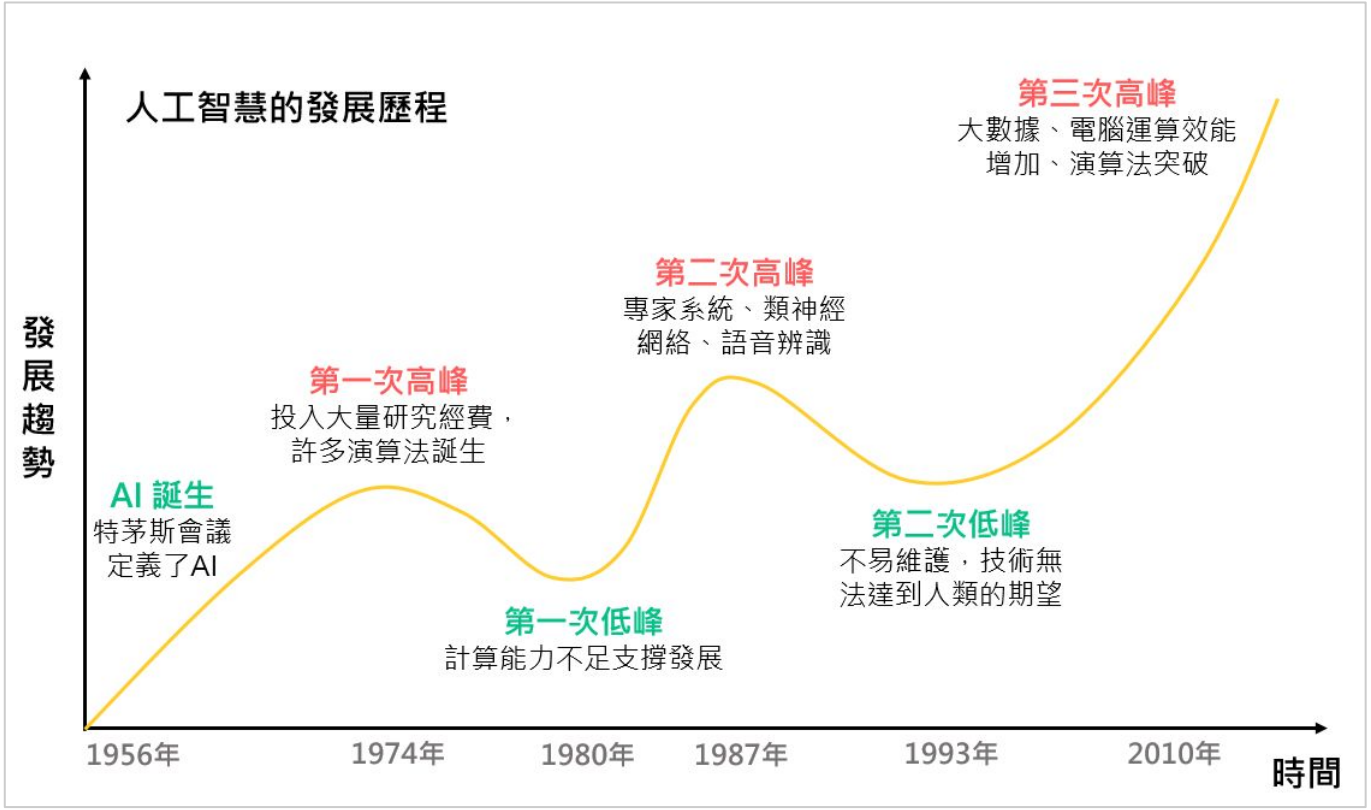
AI Overview



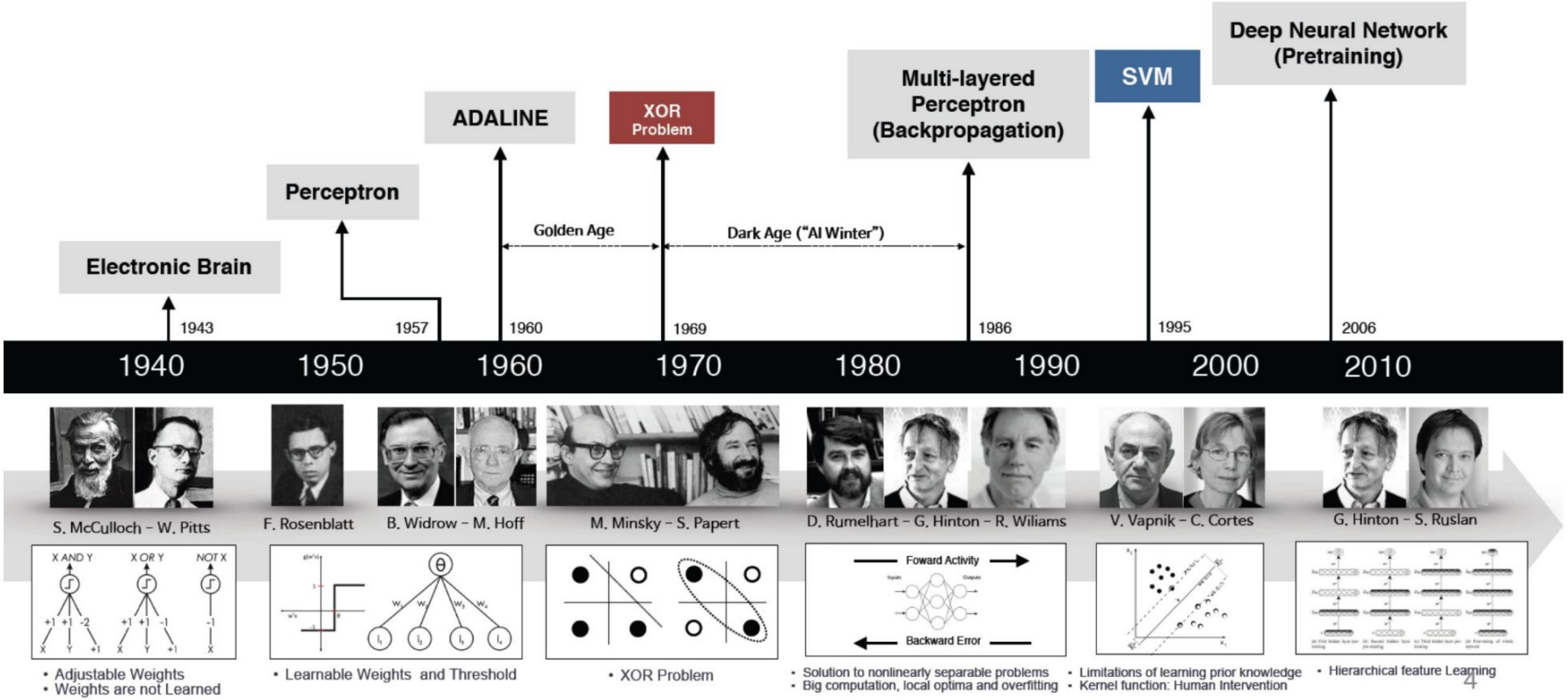
Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

AI Overview – 領域差異化

- ❌ 大一統
- ✔️ 分而治之



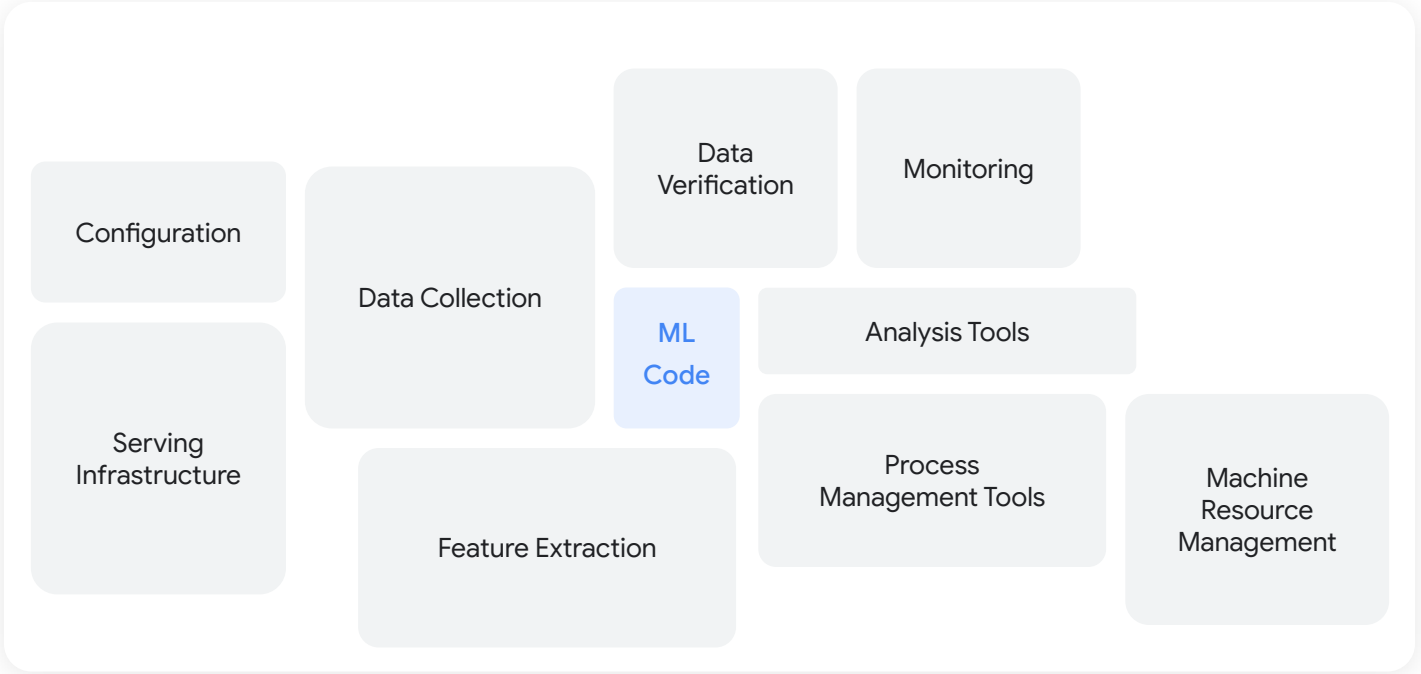
AI Overview – DL 不是一天造成的



Challenges of Operational ML Systems

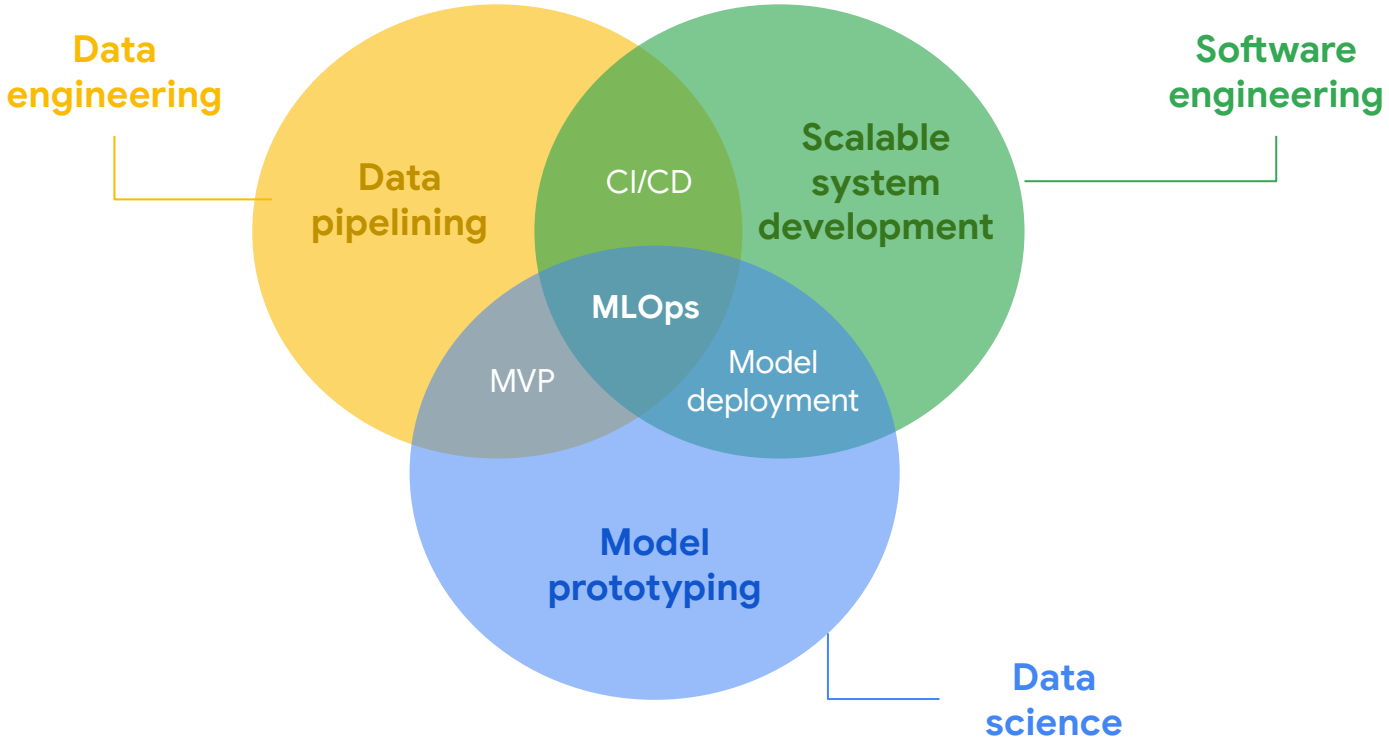
> More than 87% of data science projects
> never make it into production. –Multiple studies and surveys*

Operational ML System



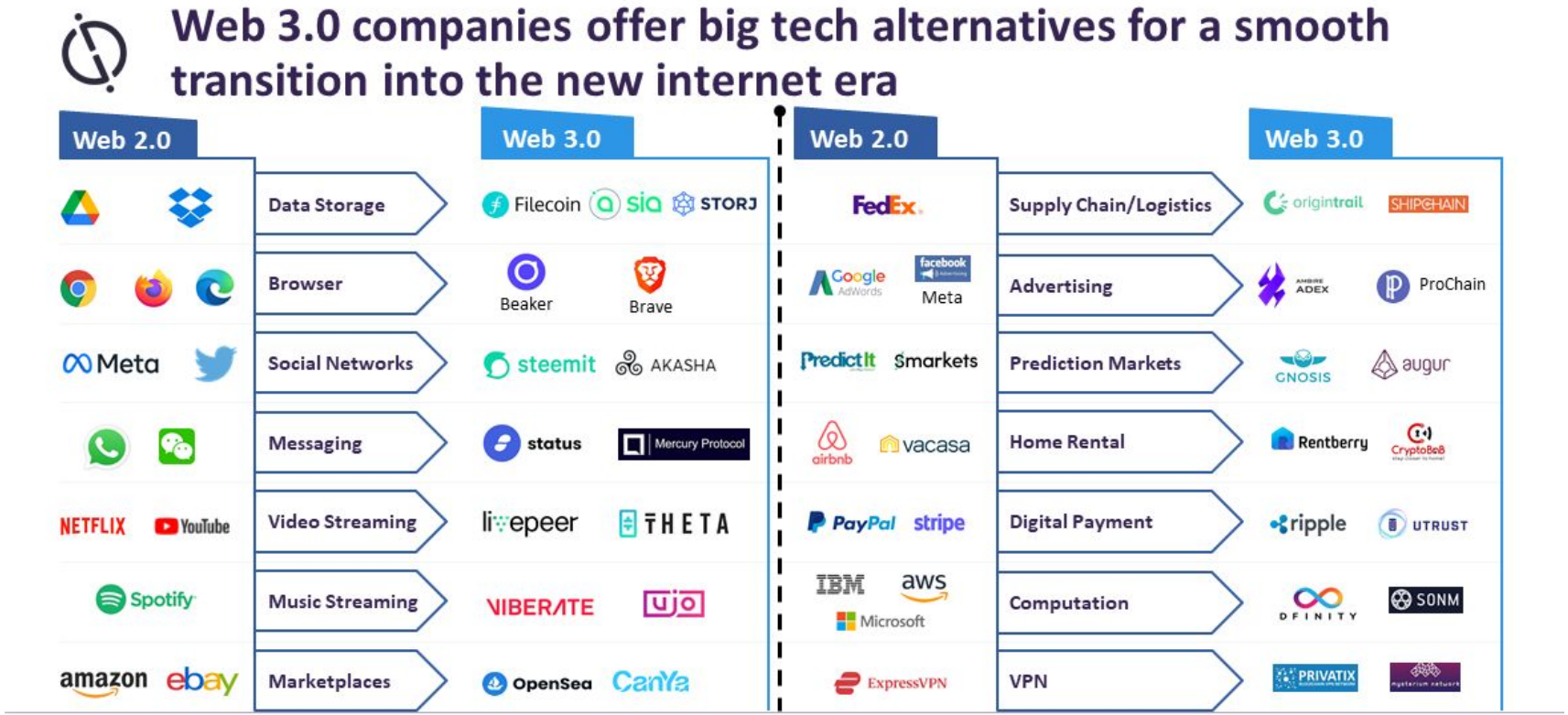
* Hidden Technical Debt in Machine Learning Systems, NeurIPS 2015

MLOps - Capability We Need



What will happen in future?

What will happen in future? (cont.)



Source: GlobalData FutureTech Series Report

GlobalData.

Google Cloud AutoML

- Overview
- Take a glance at ML API
- Introduction to AutoML
- Use Case, Scenario and demo

02

Google Cloud

Google Cloud AI/ML Strategy

👉[AI & Machine Learning Products | Google Cloud]

Tools / Stage / for different business market and audience

Solution	senario or tools
ML API	for tech (e.g. develop)
AutoML Services	build GUI for ML API. (e.g. document AI, NLP, image, Vision, Table, etc.)
AI Platform	integrate all AutoML Service. (ready to deprecate)
Vertex AI	integrate AutoML, Kubeflow, and TensorFlow Extended (TFX)

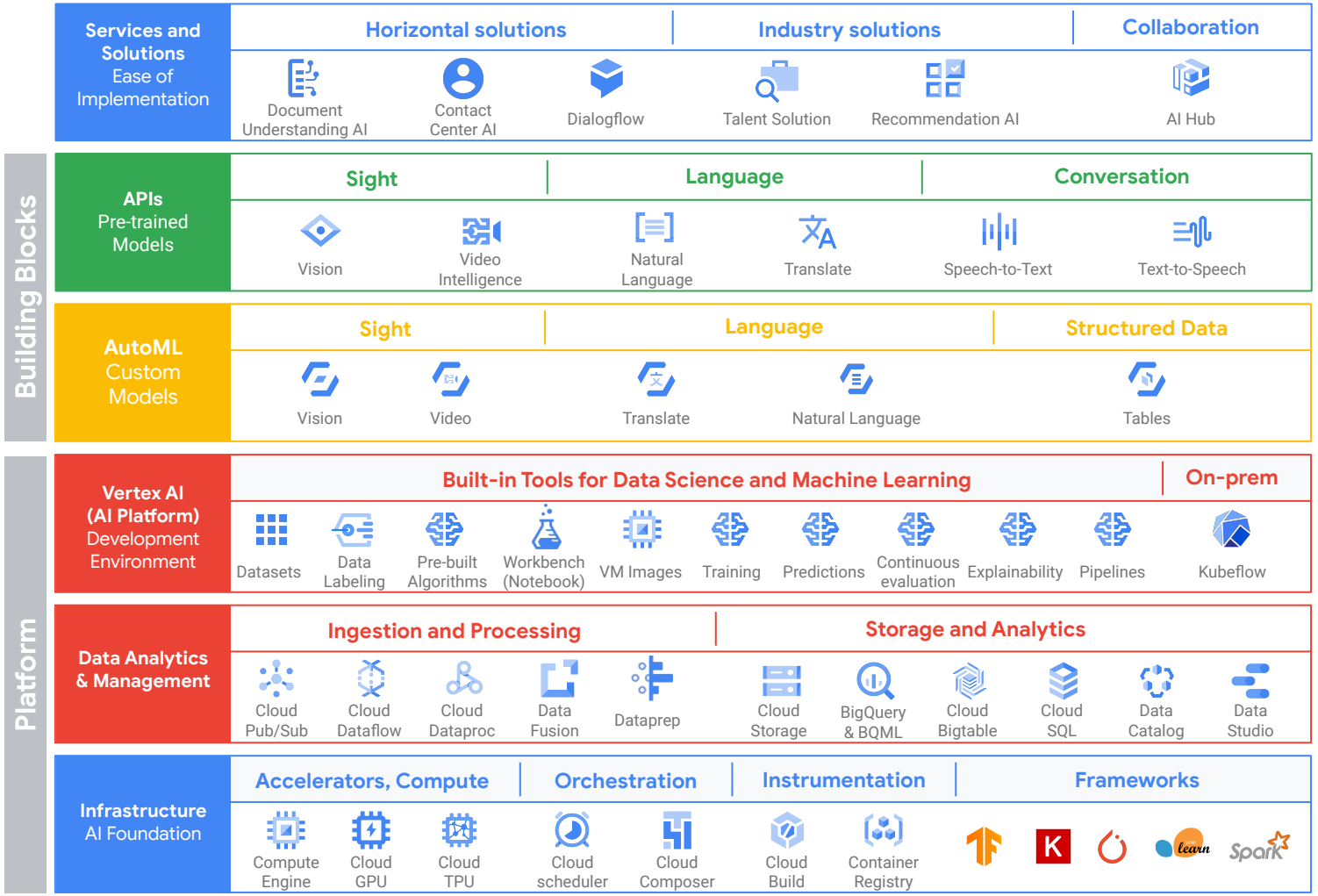
PaaS for tech & non-tech

👉[AI and Machine Learning Solutions | Google Cloud]

Total Solutions

Solution	senario or tools
Contact Center AI (CCAI)	integrate Dialogflow, STT, TTS, NLP
Document AI	integrate Vision OCR, Human-in-the-Loop
Intelligent products (Preview)	integrate Intelligent Products, Pre-built app templates for optimizing MRO
Product Discovery	integrate Vision Product Search, Recommendations AI, Retail Search

AI for every level of expertise



Google Cloud

AI for every level of expertise

ML developer
Intelligent apps

Data analyst
Query and analyze

Data scientist
Models that work

Data engineer
Get clean, useful data

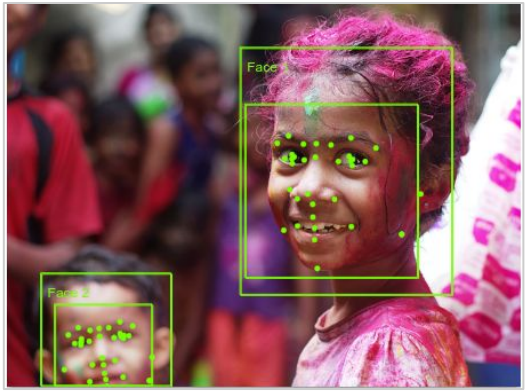
ML engineer
Models in production

Services and Solutions Ease of Implementation	Fastest way to start using AI today
APIs Pre-trained Models	No training data needed, get started right away
AutoML Custom Models	Easily create custom models (A no-code approach)
AI Platform Development Environment	Lots of control possible, but need Data Science / ML expertise
Data Analytics & Management	
Infrastructure AI Foundation	

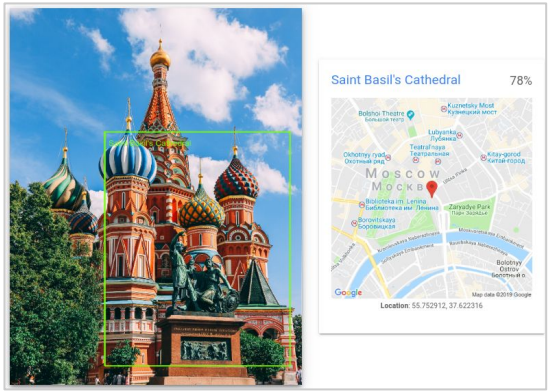
Google Cloud

ML API – Vision

👉 Features list | Try it out!!

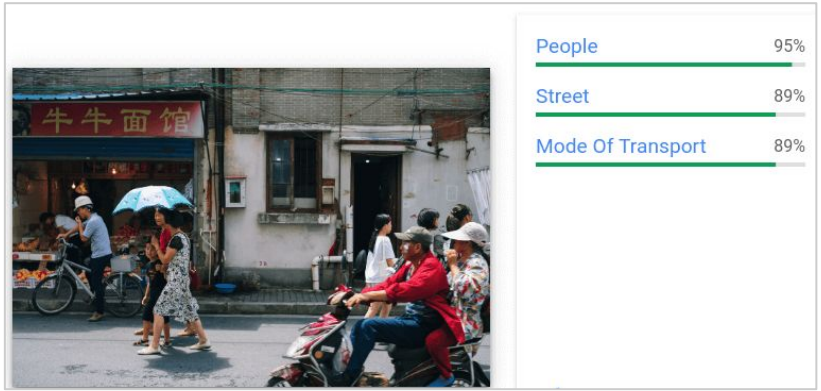


人像辨識

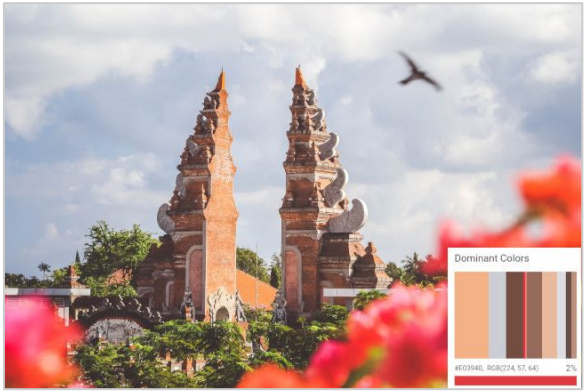


著名地標辨識

Logo 辨識



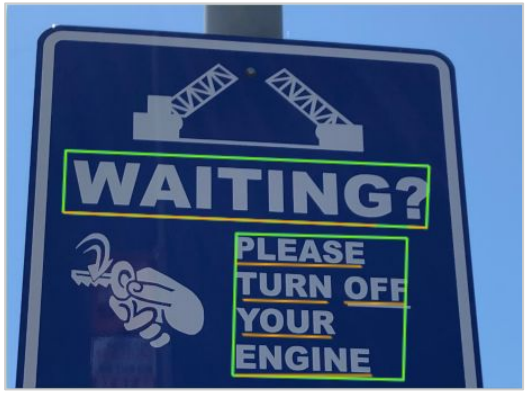
圖像標籤



圖像風格

ML API – Vision (cont.)

👉 Features list | Try it out!!



圖像 OCR

圖像物件偵測

文本 OCR(包含手寫)

Image credit: Quinten de Graaf, Unsplash.

Category	Responses
Web entities	• ***entityId***: /m/02p7_j8, ***score***: 1.3225499, ***description***: Carnival in Rio de Janeiro • ***entityId***: /m/06gmr, ***score***: 1.1684971, ***description***: Rio de Janeiro • ***entityId***: /m/04cx88, ***score***: 1.05945, ***description***: Brazilian Carnival ...
Full matching images	• ***url***: https://1000lugaresparair.files.wordpress.com/2017/11/quinten-de-graaf-278848.jpg • ***url***: https://freewalkingtourrotterdam.com/wp-content/uploads/2017/07/quinten-de-graaf-278848.jpg ...
Partial matching images	• ***url***: https://www.linnanneito.fi/wp-content/uploads/sambakarnevaali-riossa.jpg • ***url***: https://static.airhelp.com/wp-content/uploads/2019/02/26105557/two-women-in-carnival-costumes.jpg ...
Pages with matching images	• ***url***: https://travelnoire.com/best-carnival-celebrations-around-the-world/, ***pageTitle***: Best \u003cb\u003eCarnival\u003c/b\u003e Celebrations Around The World - Travel Noire, ***fullMatchingImages***: [{***url***: https://travelnoire.com/wp-content/uploads/2019/02/quinten-de-graaf-278848-unsplash.jpg}] • ***url***: https://bespokebrazil.com/rio-carnival-2019/, ***pageTitle***: Visit \u003cb\u003eRio Carnival 2019\u003c/b\u003e with the Brazil Specialists - Bespoke Brazil, ***partialMatchingImages***: [{ ***url***: https://bespoke-brazil-2018-bespokebrazil.netdna-ssl.com/wp-content/uploads/2019/01/Carnival-1.jpg}] ...
Visually similar images	• ***url***: https://www.brazilbookers.com/_images/photos/rio-carnival-images/rio-carnival-2016-carnival-date.jpg • ***url***: https://image.redbull.com/rbcom/010/2017-02-08/1331843859949_3/0100/0/1/watch-rio-carnival-2017-live-on-red-bull-tv.jpg ...
Best guess labels	rio carnival 2019 dancers

網頁圖片內容

ML API – Vision (cont.)

👉 Features list | Try it out!!

剪裁提示偵測

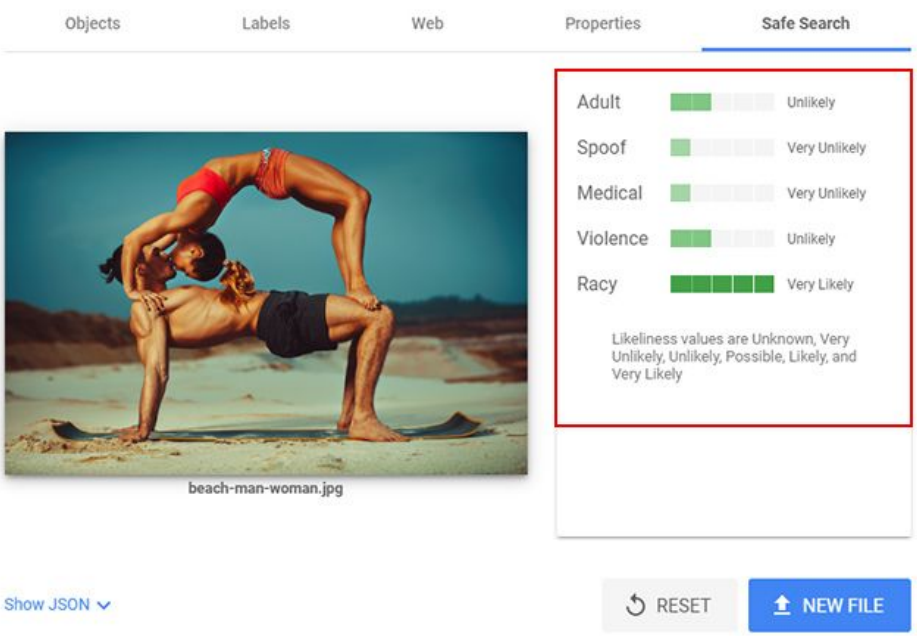
成人內容檢測
Explicit content detection (SafeSearch)

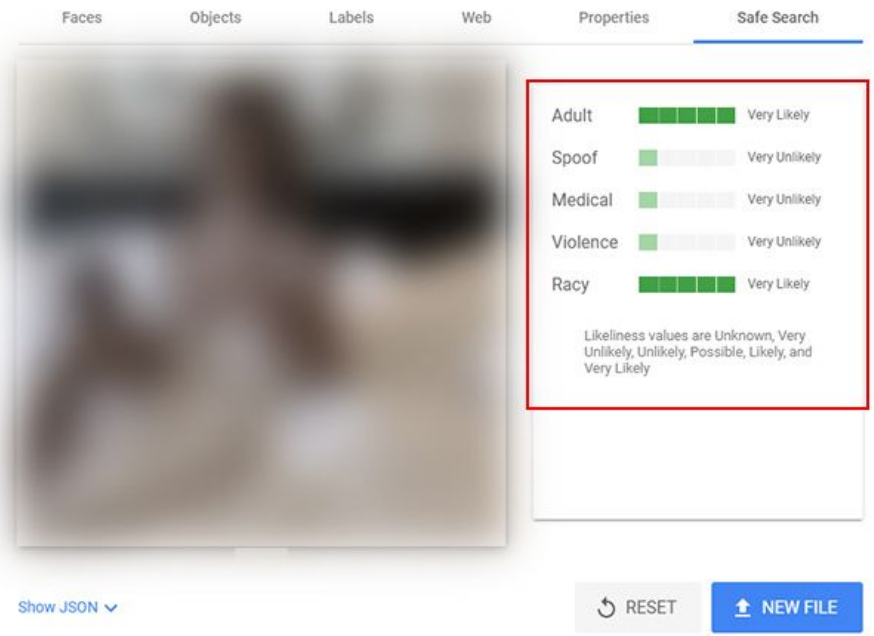
- Provides likelihood ratings for the following explicit content catgories: **adult, spoof, medical, violence, and racy**.
- Likelihoods ratings are expressed as 6 different values: **UNKNOWN, VERY_UNLIKELY, UNLIKELY, POSSIBLE, LIKELY, or VERY_LIKELY.**

ML API – Vision (cont.)

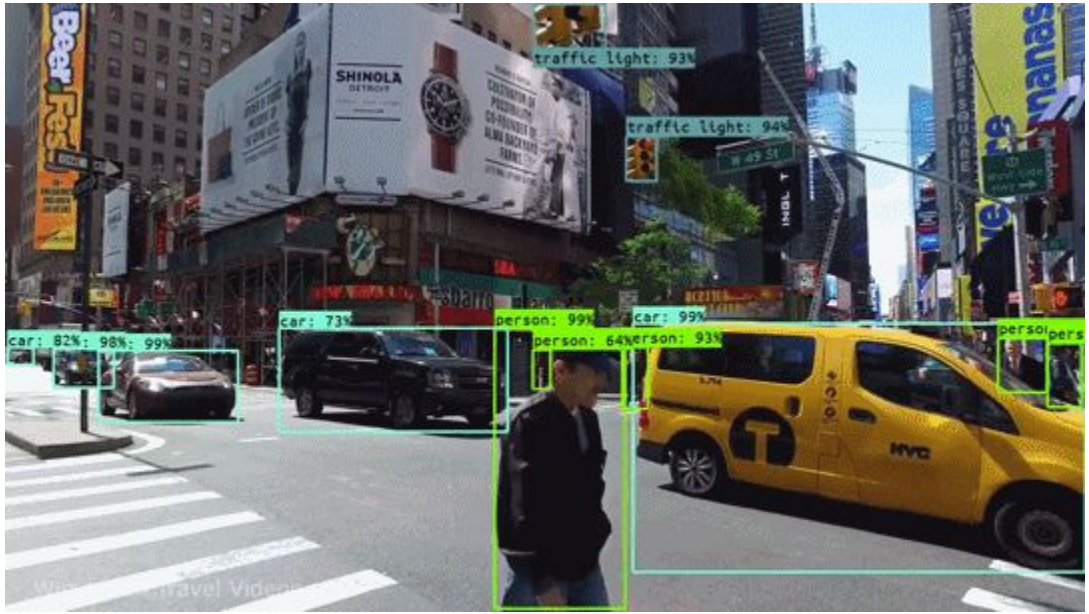
👉 Features list | Try it out!!

成人內容檢測
Explicit content detection (SafeSearch)

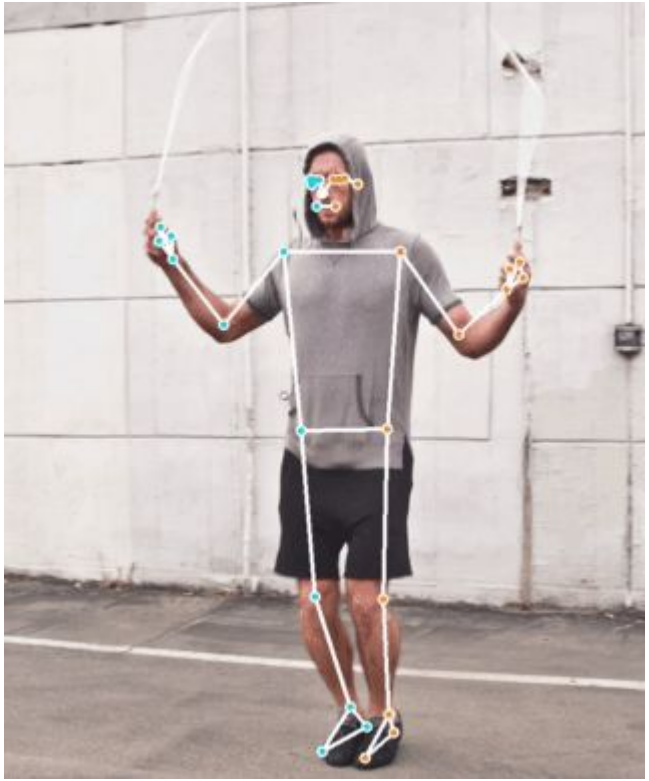




ML API – Intelligence

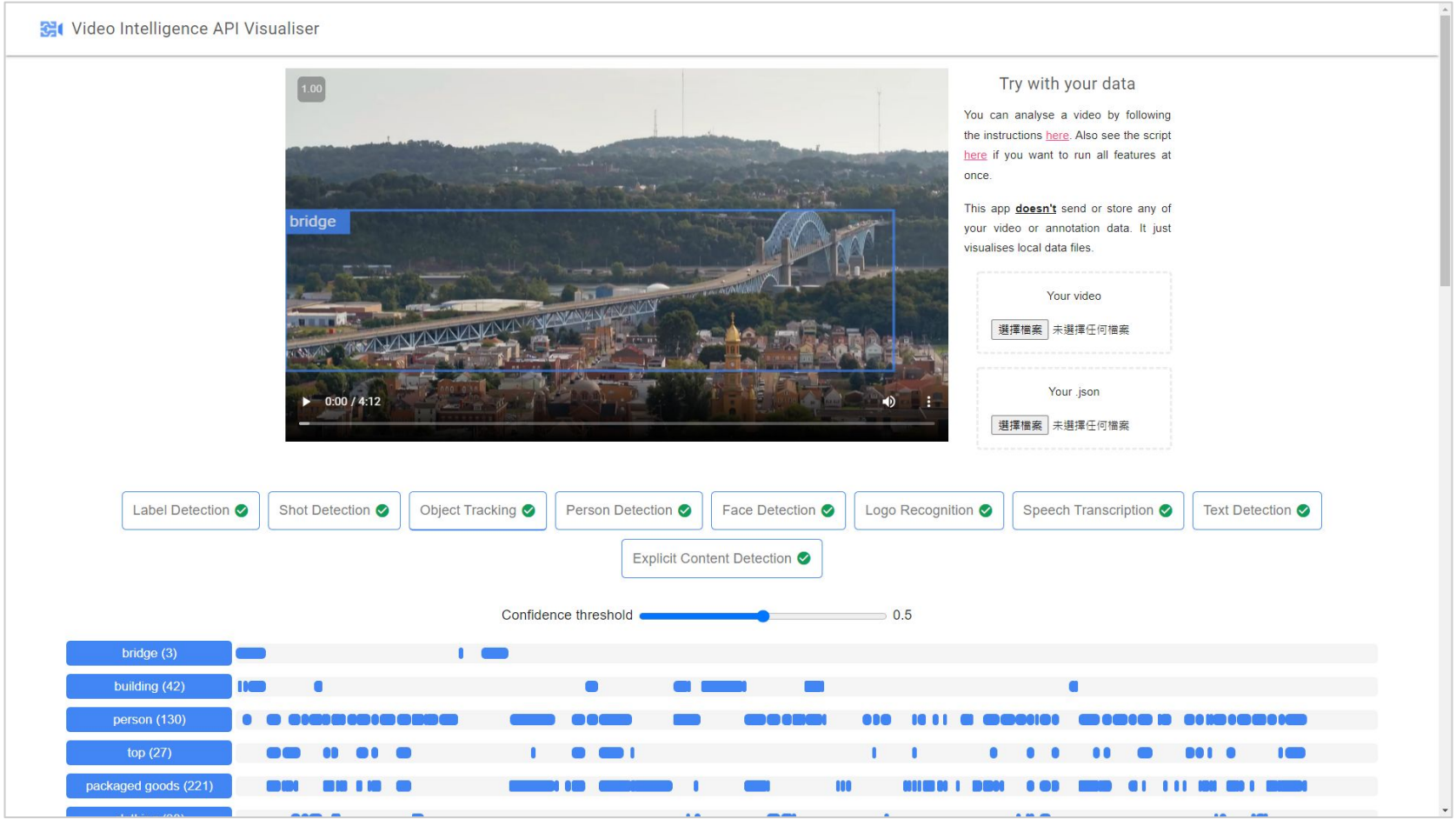


Object Detection and Tracking



Pose Detection

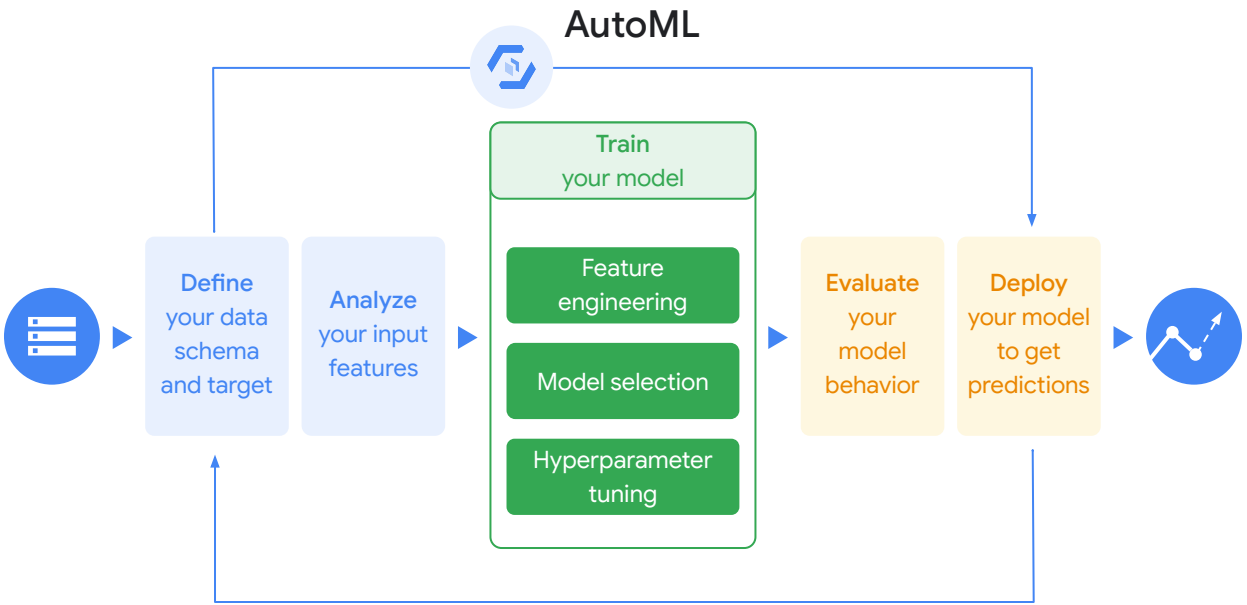
ML API – Intelligence



AutoML – Vision AI

Low/No code

Point and click to build custom, high-quality models using the AutoML workflow in Vertex AI



👉 AutoML supported Algorithm

Automatically search through Google's whole model zoo...

Linear, logistic

Feedforward DNN

Wide and Deep NN

Gradient Boosted Decision Tree (GBDT)

DNN + GBDT Hybrid

Adanet ensemble

Neural + Tree Architecture Search

...and more!

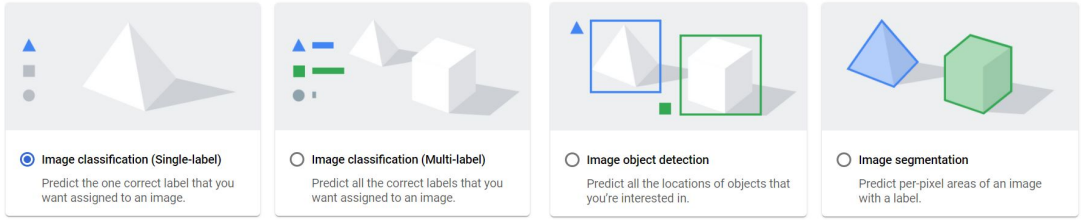
AutoML Overview

Image

圖像分類(單標籤、多標籤)

圖像物件偵測

圖像分割

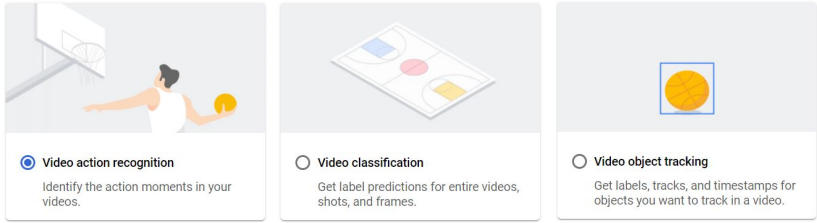


Video

影像動作分類

影像分類

影像物件追蹤

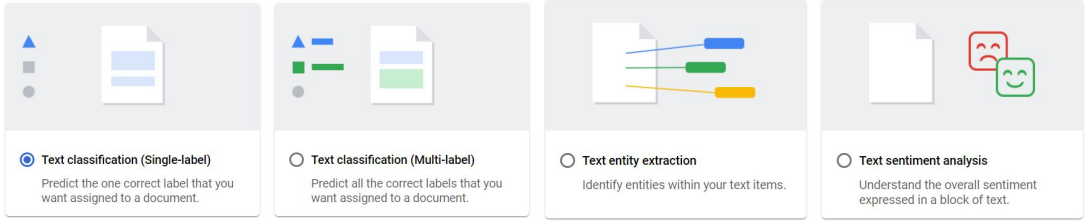


Language

文章分類(單標籤、多標籤)

文字實體識別

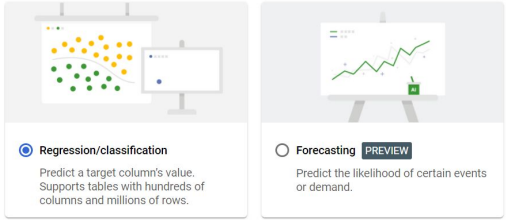
文字情緒分析



Tabular

回歸 / 分類

預測



AutoML – Vision AI

圖像分類(單標籤、多標籤)

圖像物件偵測

圖像分割

- 員工是否玩手機
- 口罩配戴是否合規
- 圖片分類歸納與校正

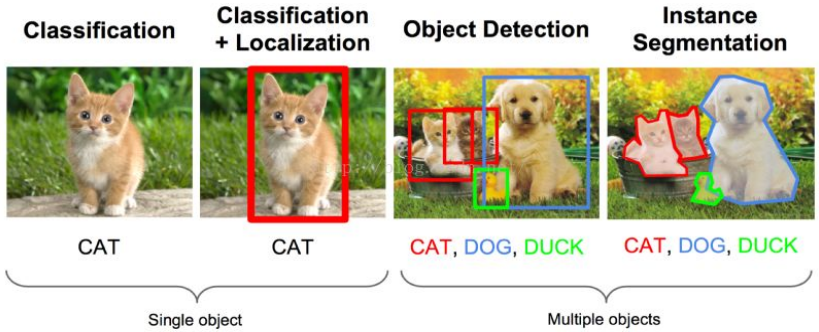
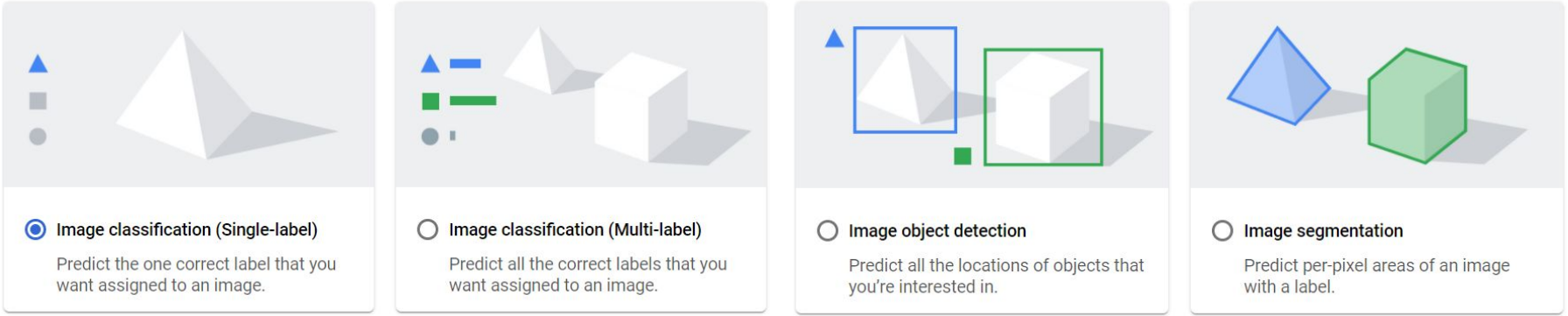
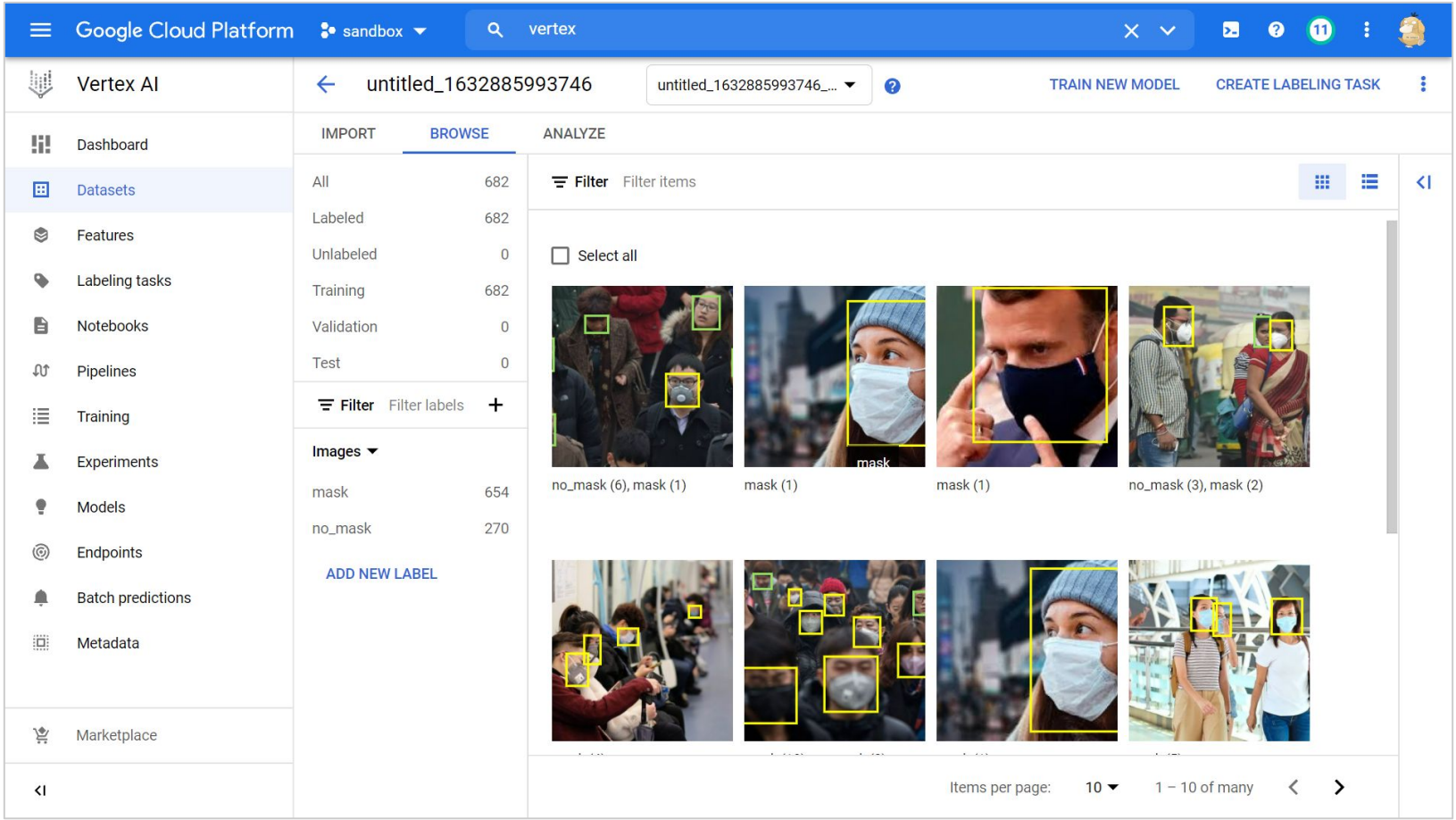


IMAGE TABULAR TEXT VIDEO



AutoML - Vision AI for mask detection



Vertex AI

Dashboard
Datasets
Features
Labeling tasks
Notebooks
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata

Marketplace

untitled_1632885993746

untitled_1632885993746_...

IMPORT | BROWSE | ANALYZE

All	682
Labeled	682
Unlabeled	0
Training	682
Validation	0
Test	0

Filter Filter labels +

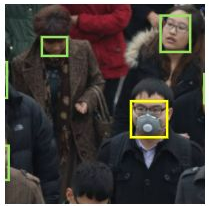
Images

mask	654
no_mask	270

ADD NEW LABEL

Filter Filter items

Select all

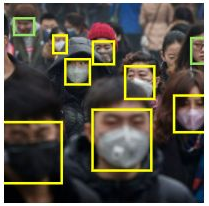

no_mask (6), mask (1)


mask (1)

mask (1)


no_mask (3), mask (2)


mask (4)


mask (10), no_mask (2)

Items per page: 10 1 – 10 of many

Training jobs and models

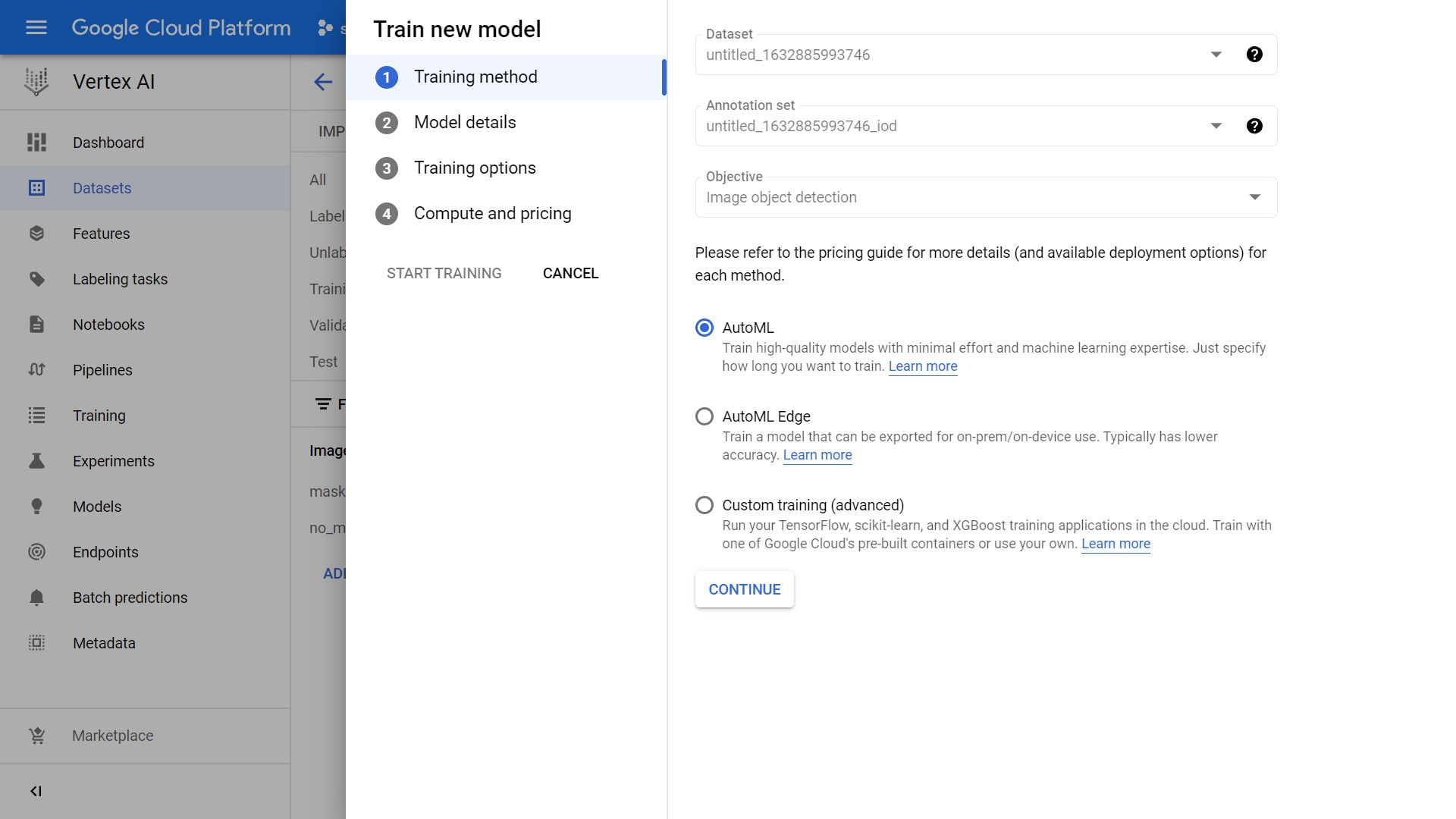
Use this dataset and annotation set to train a new machine learning model with AutoML or custom code

TRAIN NEW MODEL

Labeling tasks

If your data still needs to be labeled, create a labeling task to have others label it for you

CREATE LABELING TASK


Google Cloud Platform
Vertex AI
Dashboard
Datasets
Features
Labeling tasks
Notebooks
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Marketplace
Train new model
1 Training method
2 Model details
3 Training options
4 Compute and pricing
START TRAINING
CANCEL
Dataset
untitled_1632885993746
Annotation set
untitled_1632885993746_iod
Objective
Image object detection
Please refer to the pricing guide for more details (and available deployment options) for each method.
AutoML
Train high-quality models with minimal effort and machine learning expertise. Just specify how long you want to train. Learn more
AutoML Edge
Train a model that can be exported for on-prem/on-device use. Typically has lower accuracy. Learn more
Custom training (advanced)
Run your TensorFlow, scikit-learn, and XGBoost training applications in the cloud. Train with one of Google Cloud's pre-built containers or use your own. Learn more
CONTINUE

Google Cloud Platform

Vertex AI

- Dashboard
- Datasets
- Features
- Labeling tasks
- Notebooks
- Pipelines
- Training
- Experiments
- Models
- Endpoints
- Batch predictions
- Metadata

Marketplace

Train new model

1. Training method
2. Model details
3. Training options
4. Compute and pricing

START TRAINING CANCEL

Model name *
untitled_1632885993746_20219294146

Data split

(•) Randomly assigned ( ) Manual (Advanced)

Your dataset will be automatically randomized and split into training, validation, and test sets using the following ratios.

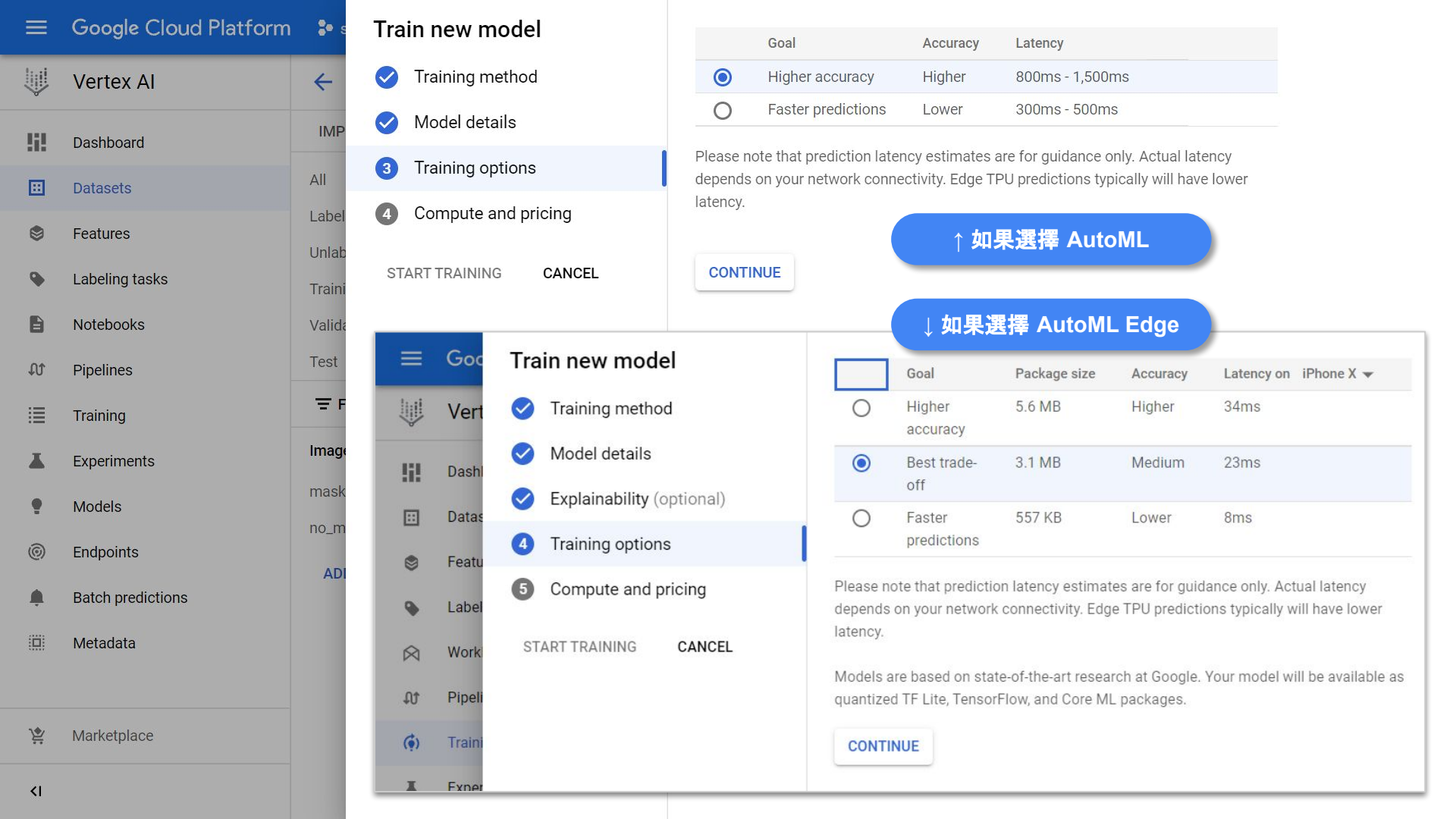
Training	Validation	Test
80 %	10 %	10 %

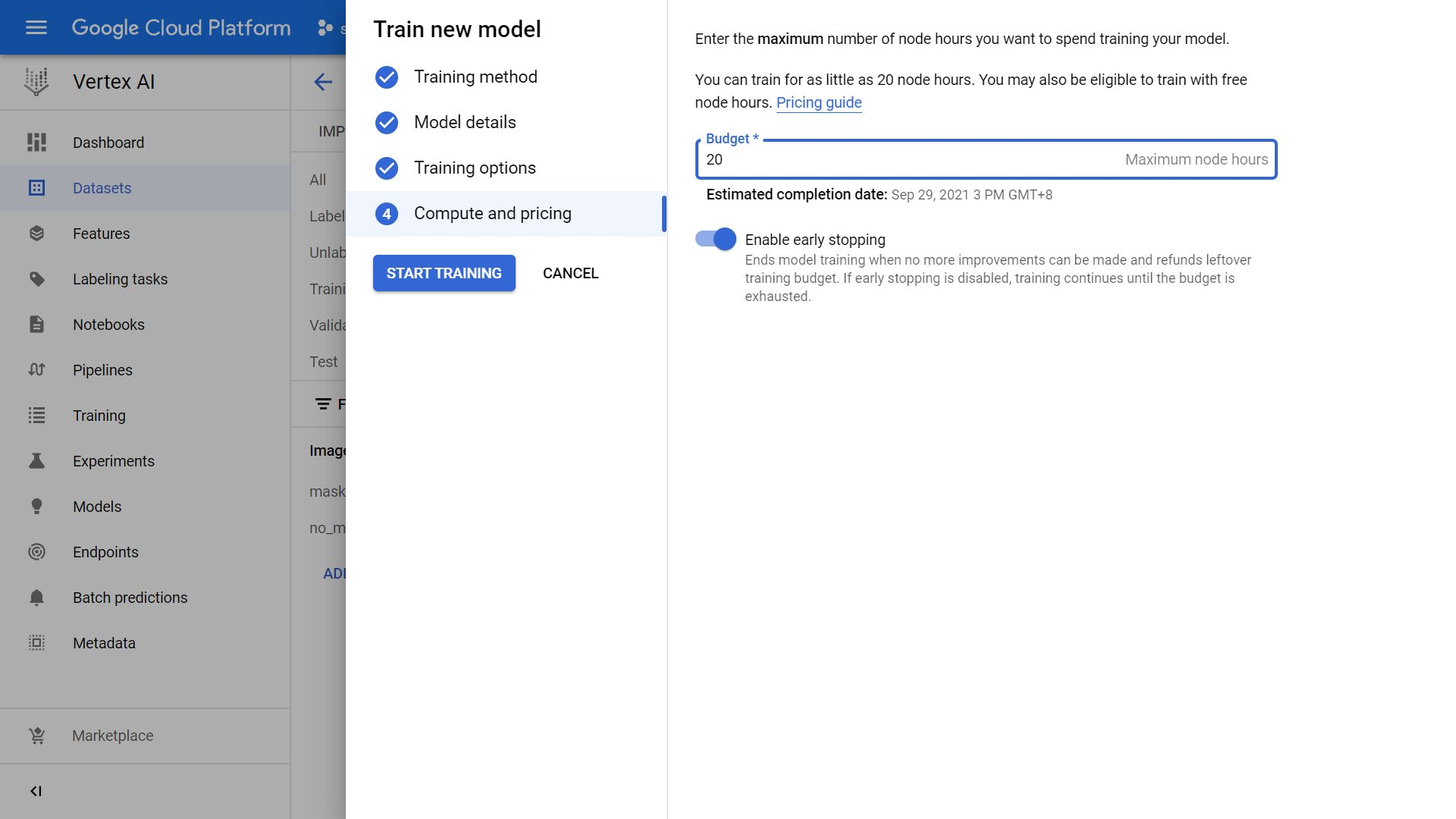
Encryption

[ ] Use a customer-managed encryption key (CMEK)

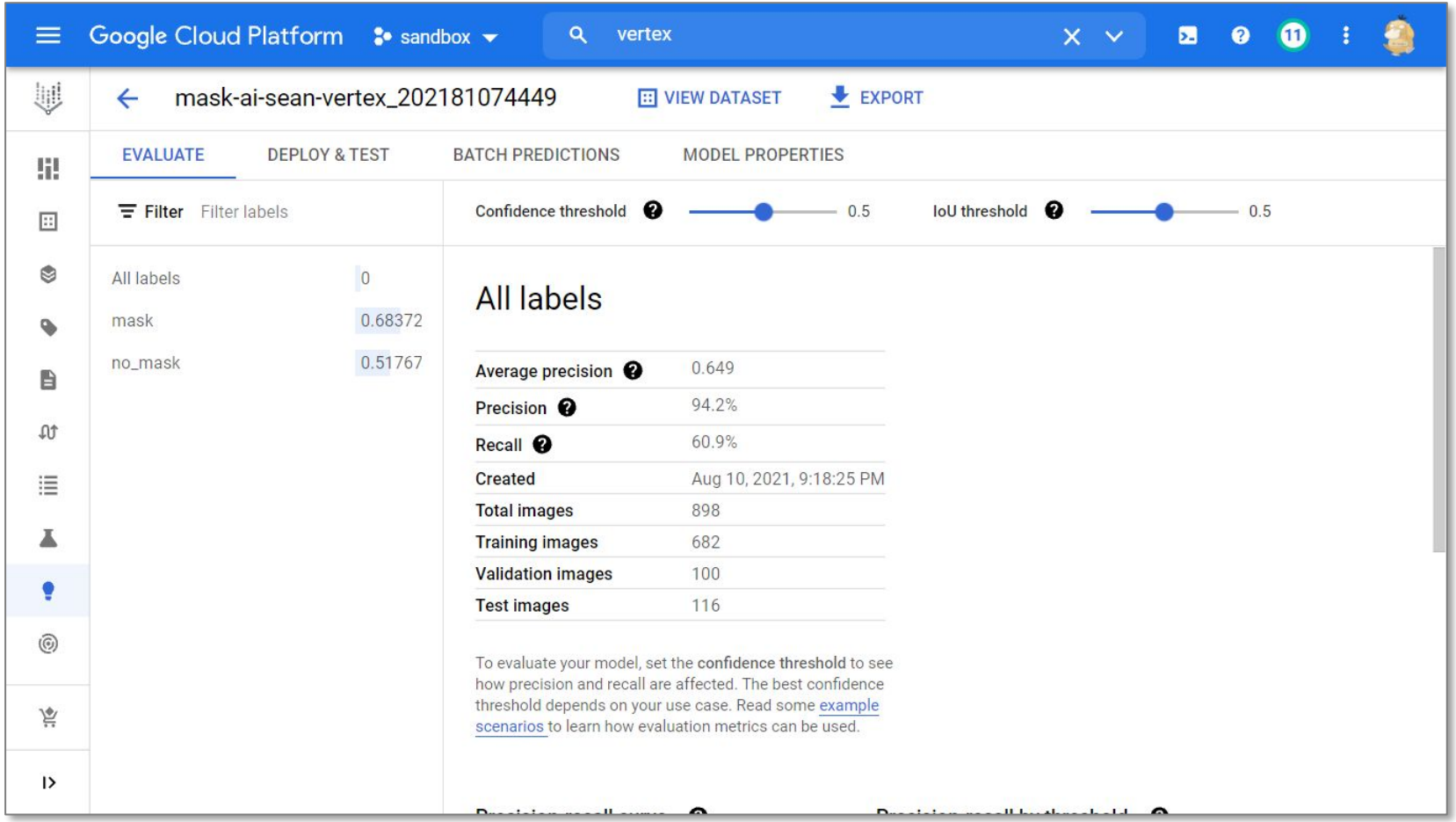
SHOW LESS

CONTINUE

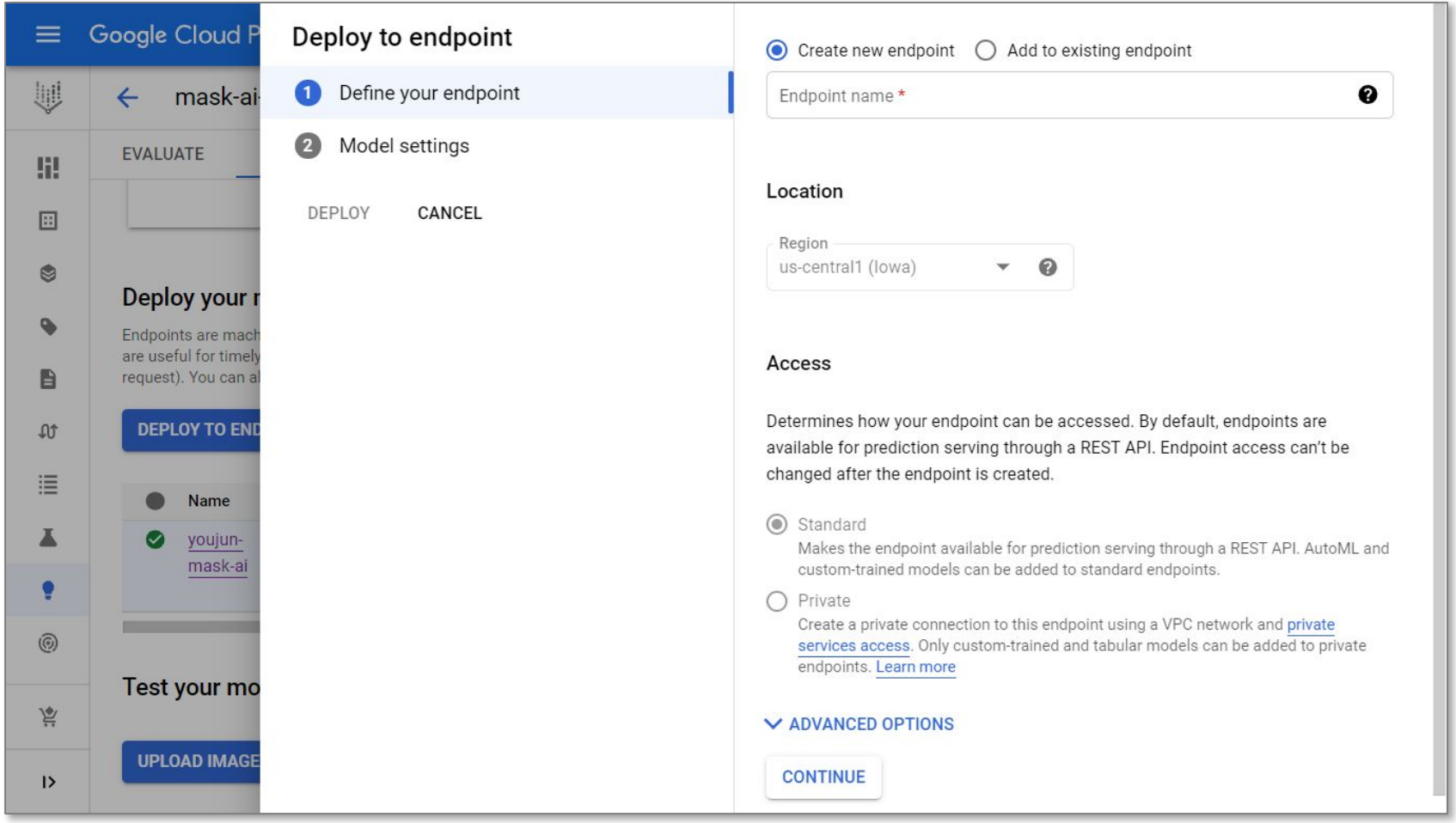

Google Cloud Platform
Vertex AI
Dashboard
Datasets
Features
Labeling tasks
Notebooks
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Marketplace
Train new model
Training method
Model details
3 Training options
4 Compute and pricing
START TRAINING
CANCEL
Goal
Accuracy
Latency
Higher accuracy
Higher
800ms - 1,500ms
Faster predictions
Lower
300ms - 500ms
Please note that prediction latency estimates are for guidance only. Actual latency depends on your network connectivity. Edge TPU predictions typically will have lower latency.
CONTINUE
↑ 如果選擇 AutoML
↓ 如果選擇 AutoML Edge
Train new model
Training method
Model details
Explainability (optional)
4 Training options
5 Compute and pricing
START TRAINING
CANCEL
Goal
Package size
Accuracy
Latency on iPhone X
Higher accuracy
5.6 MB
Higher
34ms
Best trade-off
3.1 MB
Medium
23ms
Faster predictions
557 KB
Lower
8ms
Please note that prediction latency estimates are for guidance only. Actual latency depends on your network connectivity. Edge TPU predictions typically will have lower latency.
Models are based on state-of-the-art research at Google. Your model will be available as quantized TF Lite, TensorFlow, and Core ML packages.
CONTINUE

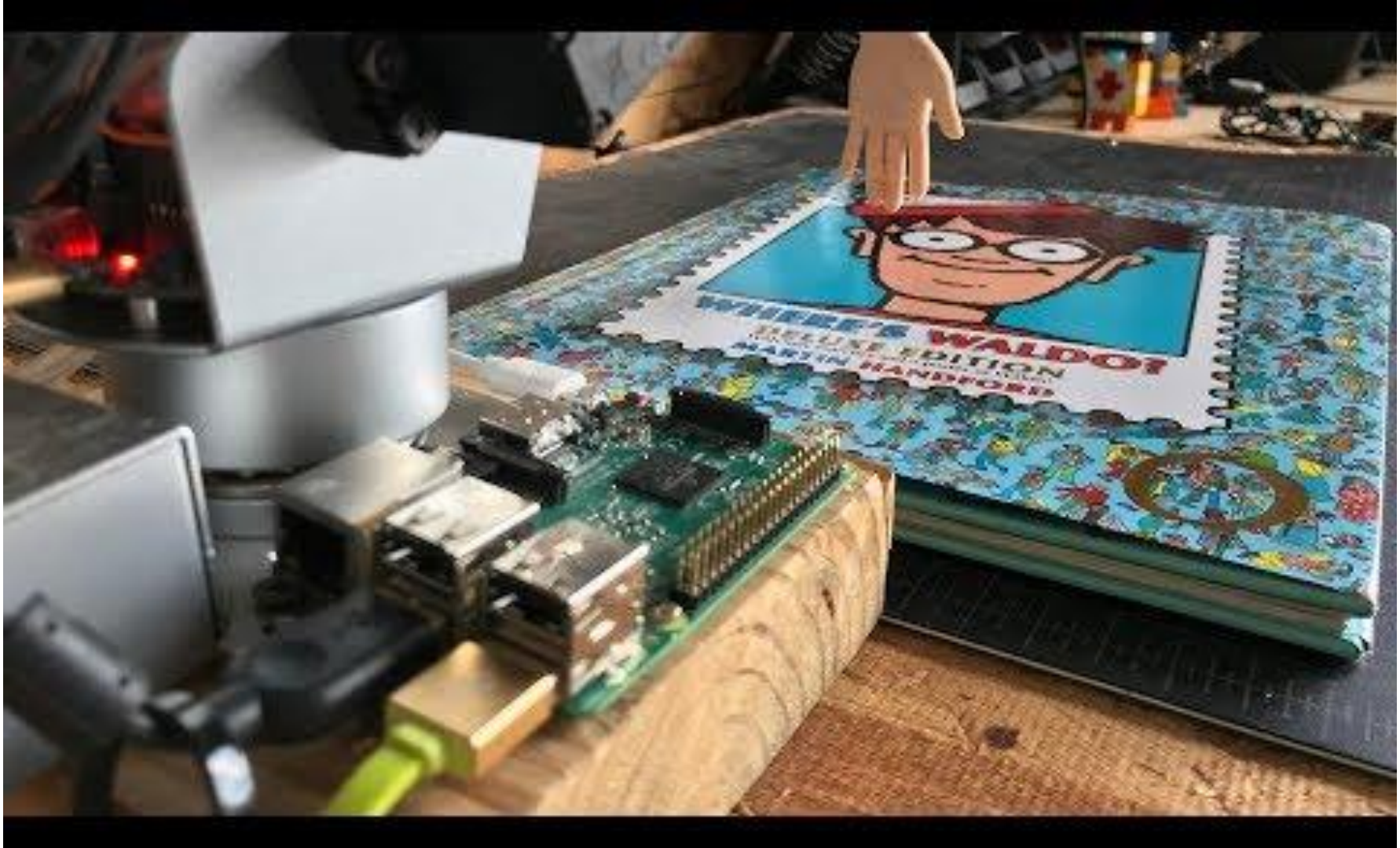

Google Cloud Platform
Vertex AI
Dashboard
Datasets
Features
Labeling tasks
Notebooks
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Marketplace
Train new model
Training method
Model details
Training options
4
Compute and pricing
START TRAINING
CANCEL
Enter the maximum number of node hours you want to spend training your model.
You can train for as little as 20 node hours. You may also be eligible to train with free node hours. Pricing guide
Budget *
20
Maximum node hours
Estimated completion date: Sep 29, 2021 3 PM GMT+8
Enable early stopping
Ends model training when no more improvements can be made and refunds leftover training budget. If early stopping is disabled, training continues until the budget is exhausted.

模型部署


Google Cloud Platform
sandbox
vertex
mask-ai-sean-vertex_202181074449
VIEW DATASET
EXPORT
EVALUATE
DEPLOY & TEST
BATCH PREDICTIONS
MODEL PROPERTIES
Filter
Filter labels
Confidence threshold
0.5
IoU threshold
0.5
All labels 0
mask 0.68372
no_mask 0.51767
All labels
Average precision 0.649
Precision 94.2%
Recall 60.9%
Created Aug 10, 2021, 9:18:25 PM
Total images 898
Training images 682
Validation images 100
Test images 116
To evaluate your model, set the confidence threshold to see how precision and recall are affected. The best confidence threshold depends on your use case. Read some example scenarios to learn how evaluation metrics can be used.

模型評估


Google Cloud P
mask-ai
EVALUATE
Deploy your r
Endpoints are mach
are useful for timely
request). You can al
DEPLOY TO END
Name
youjun-
mask-ai
Test your mo
UPLOAD IMAGE
Deploy to endpoint
1 Define your endpoint
2 Model settings
DEPLOY
CANCEL
Create new endpoint
Add to existing endpoint
Endpoint name *
Location
Region
us-central1 (Iowa)
Access
Determines how your endpoint can be accessed. By default, endpoints are available for prediction serving through a REST API. Endpoint access can't be changed after the endpoint is created.
Standard
Makes the endpoint available for prediction serving through a REST API. AutoML and custom-trained models can be added to standard endpoints.
Private
Create a private connection to this endpoint using a VPC network and private services access. Only custom-trained and tabular models can be added to private endpoints. Learn more
ADVANCED OPTIONS
CONTINUE


WHERE'S WALDO?
DELUXE EDITION
MARTIN HANDFORD

Any Questions

Google Developer
Student Clubs

TAMKANG UNIVERSITY

Thank you

特別感謝「淡江大學 TKU - Google 學生開發者社群 (GDSC) 」

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